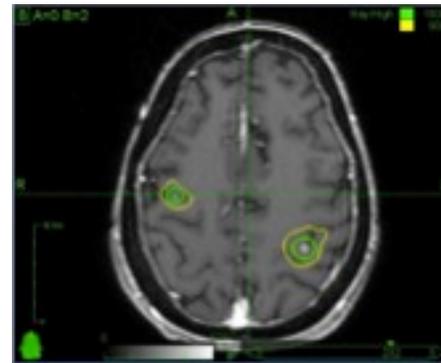


**Patient Spotlight:**

61 year-old female who presents with brain metastasis involving the left frontal lobe and right middle frontal gyrus related to primary breast cancer. She was diagnosed with breast cancer in 2008, T2N0M0, Stage IIA, estrogen and progesterone positive, Her2-neu negative, treated with breast conservation surgery and adjuvant chemotherapy and hormone suppression therapy. New neurologic symptoms prompted MRI brain in January, 2012, which confirmed a 9.5mm metastasis left frontal brain, and a 4.5mm metastasis to right middle frontal gyrus. Treatment options were discussed, to include whole brain irradiation (WBRT) or Cyberknife stereotactic radiosurgery (SRS) to the 2 brain metastasis.

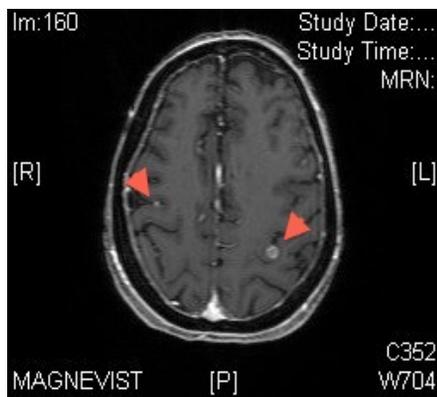
**Cyberknife Treatment Course:**

The patient was treated with a single fraction of 1,800cGy to the left frontal lobe and right middle frontal gyrus lesion on 1/27/2012. An aquaplast face mask was utilized for immobilization and 6-D skull tracking was employed throughout for live tracking and correction of movement. She tolerated treatment without complication and presenting neurologic symptoms resolved.

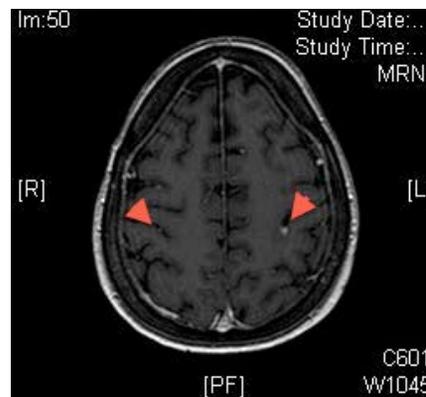


Cyberknife isodose curves  
Green: Prescription dose  
Yellow: 50% prescription dose

**Before and After Treatment Images:**



Before treatment



3 months after treatment

**Cyberknife Rationale:**

Recent evidence-based guidelines published by the American Society for Radiation Oncology (ASTRO) (1) on treatment of newly diagnosed brain metastasis indicate the following potential role(s) of stereotactic radiosurgery:

### Cyberknife Rationale (cont.)

1. In patients with good prognosis and single brain metastasis (<3 cm), either surgery or radiosurgery may be considered. (1)
2. Selected patients with brain metastasis(es) may be treated with radiosurgery alone. (1)
3. Radiosurgery boost added to WBRT in patients with multiple brain metastases and good prognosis improves control over treated brain metastases as compared with WBRT alone. (1,2,3)
4. Two randomized trials showed that omission of WBRT after radiosurgery is associated with better neurocognitive outcomes (1,4) and with better health related quality of life. (5)
6. The randomized trial RTOG 9508 (6) found an improvement in KPS and decreased steroid use at 6 months with the use of radiosurgery boost added to WBRT, but
7. WBRT alone may be considered, as there is no survival advantage with radiosurgery added to WBRT in patients with multiple brain metastases.

### Breast cancer: Stereotactic radiosurgery for brain metastases

Retrospective series analyses after SRS treatment of breast cancer metastases report high local tumor control rates between 90% and 94%. (7,8) The prognosis of patients with brain metastases of breast cancer can be correlated with performance status and control of systemic disease, with patients in RPA class I, II, and III surviving 34.9, 9.1, and 7.9 months, respectively. (8)

Tumor subtype appears to be a significant prognostic factor in breast cancer patients with brain metastasis based upon a recently published multi-institutional retrospective analysis of 383 patients. After a diagnosis of brain metastasis, median survival for the patients with the basal subtype (triple negative), Luminal A (ER/PR positive/HER2 negative), HER2 positive/ER/PR negative and Luminal B (triple positive) subtype were 7.3, 10, 17.9, and 22.9 months, respectively. (9) Another recent study from the Cleveland Clinic confirmed in 264 radiosurgically treated breast cancer patients with brain metastases a more favorable outcome in HER2+ patients relative to those with HER2- breast cancer, with a median survival of 31.3 vs. 14.1 months ( $p < 0.01$ ). (10)

### Benefits of Cyberknife Stereotactic radiosurgery for brain metastases include the following:

1. Short number of treatments (1-3) of highly focused and accurate radiation delivery which is very well-tolerated, and results in high rates of control
2. Studies demonstrate improved neurocognitive outcomes relative to whole brain irradiation
3. Improved control when added as a boost to whole brain irradiation
4. Minimal or no interruption of chemotherapy in patients who require treatment of active systemic disease.
5. High rates of local control in patients with breast cancer, with best outcomes in patients with RPA class I, and Her2-amplified breast cancer

**ILLINOIS CYBERKNIFE®**  
 AT ADVOCATE LUTHERAN GENERAL HOSPITAL

1700 Luther Lane  
 Park Ridge IL 60068  
 847-723-0100

[Illinoisck.com](http://Illinoisck.com)

**References:**

1. M.N Tsao, A. Rades, S.S. Wirth, et al. Radiotherapeutic and surgical management for newly diagnosed brain metastasis. *Pract Radiat Oncol*, 2 (2012) pp. 210-225.
2. D. Kondziolka, A. Patel, L.D. Lunsford, A. Kassam, J.C. Flickinger  
Stereotactic radiosurgery plus whole brain radiotherapy versus radiotherapy alone for patients with multiple brain metastases. *Int J Radiat Oncol Biol Phys*, 45 (2) (1999), pp. 427-434
3. H. Aoyama, H. Shirato, M. Tago et al. Stereotactic radiosurgery plus whole-brain radiation therapy vs stereotactic radiosurgery alone for treatment of brain metastases: a randomized controlled trial. *JAMA*, 295 (21) (2006), pp. 2483-2491
4. E.L. Chang, J.S. Wefel, K.R. Hess et al. Neurocognition in patients with brain metastases treated with radiosurgery or radiosurgery plus whole-brain irradiation: a randomised controlled trial. *Lancet Oncol*, 10 (11) (2009), pp. 1037-1044
5. R. Soffietti, M. Kocher, U.M. Abacioglu et al. A European Organisation for Research and Treatment of Cancer phase III trial of adjuvant whole-brain radiotherapy versus observation in patients with one to three brain metastases from solid tumors after surgical resection or radiosurgery: quality-of-life results. *J Clin Oncol*, 31 (1) (2013), pp. 65-72
6. D.W. Andrews, C.B. Scott, P.W. Sperduto et al. Whole brain radiation therapy with or without stereotactic radiosurgery boost for patients with one to three brain metastases: phase III results of the RTOG 9508 randomised trial. *Lancet*, 363 (9422) (2004), pp. 1665-1672
7. D. Kondziolka, H. Kano, G.L. Harrison et al. Stereotactic radiosurgery as primary and salvage treatment for brain metastases from breast cancer. *Neurosurg*, 114 (3) (2011), pp. 792-800
8. N. Kased, D.K. Binder, M.W. McDermott et al. Gamma Knife radiosurgery for brain metastases from primary breast cancer *Int J Radiat Oncol Biol Phys*, 75 (4) (2009), pp. 1132-1140
9. P.W. Sperduto, N. Kased, D. Roberge et al. The effect of tumor subtype on the time from primary diagnosis to development of brain metastases and survival in patients with breast cancer. *J Neurooncol*, 112 (3) (2013), pp. 467-472
10. Z. Xu, N.F. Marko, S.T. Chao et al. Relationship between HER2 status and prognosis in women with brain metastases from breast cancer *Int J Radiat Oncol Biol Phys*, 82 (5) (2012), pp. e739-47